UNIVERSITEIT GENT

FACULTY OF **VETERINARY MEDICINE**
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BENEFICIAL EFFECTS OF PROBIONTS AND THEIR MODES OF ACTION

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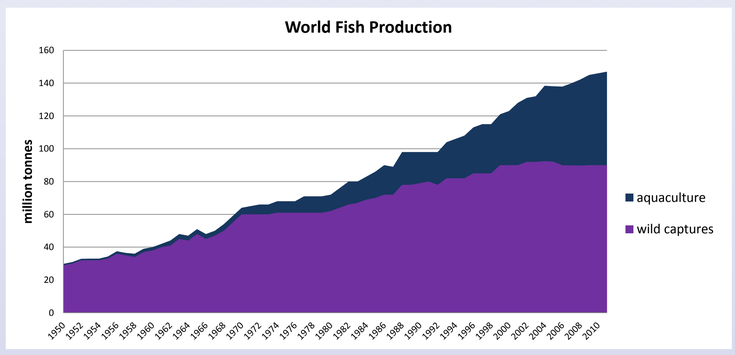
Objectives

The main goal is to study the impact of probiotics on larval development of European sea bass (*Dicentrarchus labrax*) and disease resistance. First of all effective probiotics will be selected and optimized. Secondly, we will elucidate the working mechanism of the probionts.

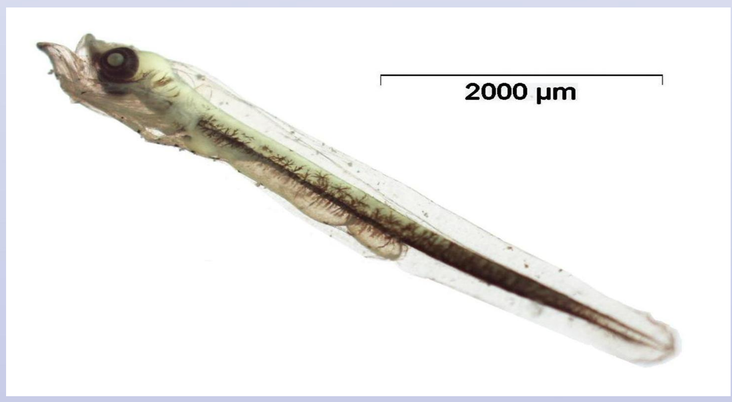
Rationale

Aquaculture evolved from a marginal industry to an industry meeting 50% of the global needs of aquatic products. However, the larval phase of the aquaculture production cycle is highly susceptible to infectious diseases.

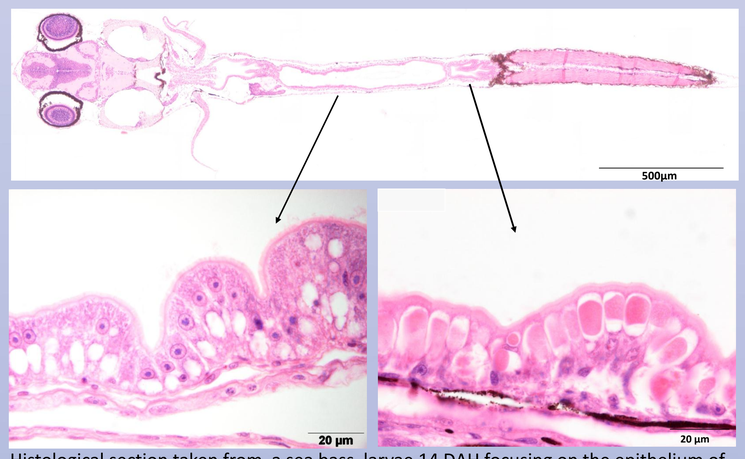
Up till recently the control of diseases relied on the use of antibiotics, leading to the development of drug resistant bacteria. Probiotic are a promising alternative to the use of antibiotics in disease control



World fish production by aquaculture and wild captures *(based on data from FAO*)



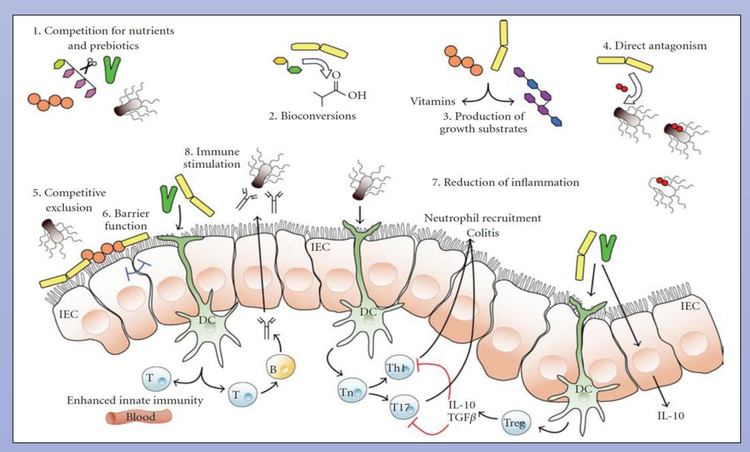
Sea bass larva 14 DAH (© *Anamaria* Rekecki)



Histological section taken from a sea bass larvae 14 DAH focusing on the epithelium of the midgut and hindgut (© *Anamaria* Rekecki)

State of the art

A numerous amount of studies have reported improved survival and growth of fish larvae when supplied with probiotics, however there is a lack of knowledge on the modes of action of the probiotics and their interaction with the aquatic host.



potential or known modes of action of probiotic bacteria *(http://www.customprobiotics.com*)

Methodology

The potential probionts will be **acquired** from healthy larval and adult sea bass.

The isolates will be **screened** for their potential as probiotic by:

→testing the ability to inhibit the growth of sea bass pathogens;

→testing the ability to adhere to the epithelial cells and the mucus of the larvae;

→testing the lack of invasiveness or toxicity towards aquatic hosts and humans.

Following, the inoculum of the selected probionts will be **optimized**.

Subsequently, the optimized probionts will be subjected to a more in depth research on the **modes of action** of the probiont, with a focus on disease resistance.

Progress beyond state of the art

The generated data will assist in developing strategies for better larval management through the manipulation of the intestinal microbial flora.